

Responses to Stakeholder Input on the Five-Year Review

As summarized in Section 5.1 of this fourth five-year-review (FYR) report, the public received notification of the start of the FYR process in June 2016 and a presentation was given at the Rocky Flats Stewardship Council (RFSC) meeting held on June 6, 2016. In response to inquiries for additional information on the FYR process, an update notification was provided to the stakeholders on the DOE-LM website and via email to the community notice distribution list.

The scope of this fourth FYR report is the Central Operable Unit (COU); lands within the Rocky Flats National Wildlife Refuge (the former Peripheral OU [POU]) were not evaluated in this FYR report. Some of the input received from stakeholders concerned topics that are not related to remedy implementation or performance at the COU and/or are outside the scope of this FYR. As such, these topics are not addressed in this appendix. Stakeholder input was grouped into general topics, if possible, in order to streamline the response process. The following table provides a summary of input received from the public and corresponding responses.

Group	Input Summary	Response
A. FYR Process	<p>Input was received related to the FYR process, as follows:</p> <ol style="list-style-type: none"><li>Public comment period for the FYR report.</li><li>Scope of the FYR.</li><li>Federal agency responsibilities and potential conflicts of interest.</li></ol>	<p>1. <i>Public comment period for the FYR report.</i> CERCLA does not require a formal public comment period for the FYR report; it only requires that the public be notified of the start of the FYR process and of the availability of the final FYR report (EPA 2001). Interested RF stakeholders were notified of the start of the FYR at a June 2016 Rocky Flats Stewardship Council (RFSC) meeting, via email, and through notice posted on the DOE-LM website. The public was invited to submit questions and other input to the e-mail address provided in the notice and listed on the LM website. A notice when the final FYR report is issued will be distributed in the same manner as the initial FYR notice. As always, DOE accepts input from the public during RFSC meetings and in response to quarterly and annual reports and presentations.</p> <p>2. <i>Scope of the FYR.</i> EPA guidance indicates that a FYR is completed for sites where hazardous substances, pollutants, or contaminants remain above levels that allow for unlimited use and unrestricted exposure (UU/UE)(EPA 2001). The COU is the only operable unit associated with the former RFP that meets this condition; and therefore, EPA requires that a FYR be completed for the COU. The remaining operable units associated with the former RFP (the POU [now the Wildlife Refuge] and OU3) were determined to meet UU/UE conditions in 2007 and were deleted from the NPL (Volume 72 Federal Register p. 29276). Therefore, a FYR is not required for the lands that comprise the POU or OU3. This fourth FYR report, however, did evaluate changes to toxicity factors and other risk parameters in relation to the UU/UE determinations for these two OUs (see Appendix C).</p> <p>3. <i>Federal agency responsibilities and potential conflicts of interest.</i> EPA is not responsible for conducting FYRs at federal NPL sites. CERCLA §120 allows the federal department with control of the site to serve as the lead agency for the FYR with EPA providing oversight. However, EPA retains final authority to make or concur with protectiveness determinations. For the COU, DOE-LM is considered the lead agency and completes the FYR; EPA will either concur with the lead agency protectiveness determination or provide independent findings. CERCLA does not require that an independent authority, other than the EPA, evaluate the protectiveness of the remedy.</p>
B. Accelerated Cleanup	<p>The protocols and cleanup standards applied during accelerated actions at the RFP were insufficient and the cleanup was incomplete.</p>	<p>Rocky Flats was investigated and remedies were selected in compliance with the Rocky Flats Cleanup Agreement (RFCA), signed by the CDPHE, EPA, and DOE in 1996. The agreement prescribed an accelerated closure process based on applicable environmental regulations and close consultation among the agencies. Surface soil action levels in the agreement were calculated using very conservative methodologies and based on a lifetime excess cancer risk of 1 in 100,000 for a wildlife refuge worker. By comparison, the normal lifetime cancer risk in the U.S. is approximately 1 in 3. When exceeded, these action levels triggered removal actions. Plutonium was one of the primary contaminants of concern; its one in 100,000 carcinogenic risk was calculated to be equivalent to 116 pCi/g of soil. After discussions with community officials, the regulatory agencies further reduced the action level for plutonium to 50 pCi/g of soil. Following remediation, residual plutonium concentrations in surface soil were below levels of regulatory concern. The final remedy in the CAD/ROD was based on the Remedial Investigation/Feasibility Study (RI/FS) report, which included a comprehensive risk assessment that evaluated both human and ecological risks. The remedy chosen in the 2006 CAD/ROD, conformed to state and federal environmental regulations.</p>

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C. Land Use Assumptions	<p>The adequacy of remedies at Rocky Flats are limited by specific land use assumptions that are no longer valid. Specific concerns include:</p> <ul style="list-style-type: none"><li>- To justify deletion of the areas now constituting the Wildlife Refuge from CERCLA, assumptions were made about the lack of soil disturbance and human exposures that are now very questionable given plans for a DOE funded visitor center, trail construction as part of the Greenway project and future highway construction.</li><li>- Other human receptors such as construction workers building highways or bike paths, or volunteers working on trails and other maintenance activities, were never considered and no such exposures have been formally evaluated.</li><li>- New exposure pathways now exist that have never been evaluated due to changes in land use and the 100-year flooding event.</li><li>- There is no data or other information sufficient to establish that the current remedies are adequate to protect human health in the face of the planned land use changes or the impacts of the flooding event. The Five-year review must recommend either a reevaluation of the remedies to address these issues or call for a halt to the land use changes.</li><li>- Significant changes in circumstances, including burgeoning housing developments adjacent to the site and proposed increased public access to the Refuge, have rendered the COU remedy's physical and institutional controls obsolete and ineffective.</li></ul>	<p>The land use for the COU remains consistent with that stated in the CAD/ROD.</p> <p>Lands that constitute the POU and OU3 were determined to be suitable for any use (i.e., UU/UE). This means that there are no restrictions on the use of the Refuge or OU3 lands and they may be used for any activity (i.e., under any scenario). As a result, changes in land use will not affect the UU/UE determination.</p> <p>The impacts of the severe weather events experienced during this FYR period are discussed in relation to remedy protectiveness in Sections 6.1.3.1, 6.1.4.2, and 6.3 of this FYR report.</p>

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D. Additional Monitoring	<div>1. Conduct air/dust monitoring within the COU.</div> <div>2. Conduct air/dust monitoring and soil sampling within the Rocky Flats National Wildlife Refuge.</div> <div>3. How can you know whether air and soil conditions have changed if there is no monitoring?</div>	<div>1. <i>Conduct air/dust monitoring within the COU.</i> Monitoring of air was not required by the CAD/ROD as part of the final remedy for the COU because vast amounts of data on contamination at and near Rocky Flats had already been gathered. Air monitoring essentially began when the RFP began operating in 1952; large-scale, continuous air monitoring began as early as 1971. The Department of Energy conducted point source air monitoring (e.g., stack and building emissions) and ambient air monitoring to demonstrate regulatory compliance, as well as to monitor fugitive radionuclide emissions from decommissioning, remediation, and demolition operations. CDPHE operated an air monitoring network inside the RFP boundary and a network of five perimeter samplers outside the boundary. During closure, EPA set up monitors adjacent to cleanup projects to ensure that radiation limits for workers were not exceeded. In 1989, federal regulations were issued for protection of the public from radioactive air emissions from DOE facilities (40 CFR 61, Subpart H). These regulations, the <i>National Emission Standards for Emissions of Radionuclides Other Than Radon From Department of Energy Facilities</i> (Rad-NESHAP), limit annual dose through the air pathway to any member of the public to 10 mrem/year. The dose from radionuclide air emissions (plutonium, americium, and uranium) at the RFP never exceeded this limit. In fact, for the entire period of active demolition and remediation at the site which would have generated the greatest amount of airborne dust, annual dose was less than 3% of the standard. With completion of accelerated actions in 2005, all air emissions point sources (e.g., buildings) had been eliminated and non-point (diffuse) sources had been significantly reduced by remediation of contaminated soil. Subsequent revegetation of disturbed areas further reduced diffuse source emissions. The CAD/ROD acknowledged that the resuspension of residual radioactive contaminants attached to surface soil particles would remain a potential source of ongoing air emissions at the site (DOE, EPA, CDPHE 2006). However, air dispersion modeling conducted following accelerated actions concluded that the resulting dose to a member of the public from these diffuse sources would still be much less than the 10 mrem/year standard (DOE 2006). The CAD/ROD concluded that, "With completion of all accelerated actions and the attendant removal of all historical air emissions sources except for wind erosion of the minor, remnant contamination in surface soils, future air emissions from the site will be less than those in the past" (past air emissions were less than 3% of the standard). After demonstrating that the Rad-NESHAPs limit was not exceeded for many years before, during and after site cleanup, DOE sampling was terminated in 2007; CDPHE discontinued air monitoring in 2005. Current site conditions in the COU are protective of the public and air/dust monitoring is not necessary.</div> <div>2. <i>Conduct air/dust monitoring and soil sampling within the Rocky Flats National Wildlife Refuge.</i> Lands that comprise the Refuge, or POU, were determined to be suitable for any use, that is, they meet the criteria for UU/UE. This means that there are no restrictions on the use of the Refuge lands. Air monitoring is not required on the Refuge based on the years of monitoring data collected at the former RFP (within the COU and POU), as summarized in response #1 above. Soil data collection is not required because the data available at the time of the final remedy decision was more than adequate to determine conditions in the POU; contaminant levels in soils in the POU are below risk-based regulatory levels that would require restrictions. Therefore, site conditions on the Refuge are protective of the public and air/dust or soil monitoring is not necessary.</div> <div>3. <i>How can you know whether air and soil conditions have changed if there is no monitoring?</i> Monitoring would provide direct evidence of air and soil conditions, however monitoring of air and soil was not required by the CAD/ROD as part of the final remedy for the COU. Monitoring was not required because vast amounts of data on contamination at and near the former RFP have already been gathered. Surface water monitoring can serve as an indicator of remobilization of contaminants from surface soils, as discussed in Sections E1.2.1.1 and E1.2.1.2 of this fourth FYR report. In addition, a lack of major erosion and the establishment of mature vegetation tends to reduce the probability of contaminants entering the air or being removed from the soil.</div>

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E. Question A	<p>Based on POC/POE exceedances of RFLMA standards and OLF slumping, DOE cannot state that the remedy is functioning as intended by the decision document. Specific concerns include:</p> <ol style="list-style-type: none"><li>1. Uranium exceedance at WALPOC.</li><li>2. OLF slumping.</li><li>3. Data is inadequate to determine protectiveness; DOE is collecting insufficient or incorrect data to support permanent resolution of remedy failures.</li><li>4. The water sampling protocol is limited by flawed assumptions and weather-related failures.</li><li>5. DOE is collecting insufficient or incorrect data to support permanent resolution of remedy failures.</li></ol>	<p>Section 6.1 of this fourth FYR discusses Question A, “Is the remedy functioning as intended by the decision documents?”</p> <p>1. <i>Uranium exceedance at WALPOC.</i> The reportable conditions at the POEs and POCs during this FYR period and how they relate to the protectiveness of the remedy are discussed in Sections E1.2.1 and 6.1.3.1, respectively. DOE acknowledges that this is the first time uranium standards at WALPOC have been exceeded since closure of the Site. As a result, a comprehensive evaluation of these conditions was conducted (see Section 6.1.3.1). It should be noted, however, that POC results are not the only remedy performance indicators evaluated by the RFLMA parties. Other indicators include surface water monitoring results from locations upstream of POCs, groundwater monitoring results, landfill inspection results, treatment system O&amp;M monitoring and performance monitoring results, and observations during inspections. The evaluation of POC and POE exceedances and any subsequent corrective actions are addressed through the RFLMA consultative process. Monitoring data is reported in the quarterly and annual RFLMA reports and discussed with the public at the quarterly RFSC meetings.</p> <p>2. <i>OLF slumping.</i> Refer to Section 6.1.4.2 of this fourth FYR report for a discussion of the OLF in relation to protectiveness.</p> <p>3. <i>Data is inadequate to determine protectiveness.</i> The media (surface water and groundwater) to be monitored at the former RFP following closure were determined in the 2006 CAD/ROD, based on the results of the RI/FS. Monitoring frequency and sample analyses are prescribed by RFLMA. Monitoring data are important in the evaluation of site protectiveness, but must be reviewed in conjunction with other information in order to determine whether the remedy is protective. Other such information includes landfill inspection results, groundwater treatment system operations and maintenance monitoring, observations during site-wide inspections, and effectiveness of institutional and physical controls.</p> <p>4. <i>The water sampling protocol is limited by flawed assumptions and weather-related failures.</i> The surface water monitoring sample collection protocols have been enhanced to limit data loss during extreme weather events (see also Group I response below).</p> <p>5. <i>DOE is collecting insufficient or incorrect data to support permanent resolution of remedy failures.</i> DOE does not rely solely on the routine monitoring data collected under RFLMA to make decisions on remedy performance. For example, DOE has contracted two independent studies of the slumping at the OLF (see Section 6.1.4.2 of this fourth FYR report) and a comprehensive study of uranium in the Walnut Creek drainage (see Section 6.1.3.1) to better understand these site conditions. The RFLMA consultative process provides the mechanism for the identification of data needs and allows for the collection of additional data/information to support evaluation of site conditions (e.g., OLF slumping, POC exceedances).</p>
F. Question B	<ol style="list-style-type: none"><li>1. What is the trigger for RAO revision?</li><li>2. How do you know if exposure mechanisms have changed?</li></ol>	<p>Section 6.2 of this FYR discusses Question B, “Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of remedy selection still valid?”</p> <p>1. <i>What is the trigger for RAO revision?</i> As stated in EPA guidance, the FYR should include an evaluation of remedy performance and RAOs to determine if the RAOs are being met. Depending on the outcome of this evaluation, it may be necessary to modify the RAOs, modify the remedy, or conduct further response actions. The fact that a RAO is not currently being met, however, does not necessarily compel action. For example, the 2006 CAD/ROD acknowledged that residual concentrations of VOCs in groundwater in some areas “are likely to persist in the environment at Rocky Flats for decades to hundreds of years” (DOE, EPA, CDPHE 2006). This suggests that Groundwater RAO 2 (see Table 4 of this fourth FYR report) may not be achieved for some time. Nevertheless, the remedy currently remains protective because institutional controls restrict the use of groundwater and prohibit the construction of buildings, thereby controlling exposure.</p> <p>2. <i>How do you know if exposure mechanisms have changed?</i> The best way to know if there are new exposure pathways would be through direct observation of land use and monitoring of institutional controls. Changes in land use plans or zoning for areas surrounding a site may result in updated assumptions.</p>

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G. Question C	The comprehensive Five-year Review Guidance at Section 4.0 specifically calls out natural disasters, such as a 100-year flood event, as requiring an affirmative answer to Question C from the EPA Guidance. This makes further evaluation of the adequacy of the remedy in light of the flooding event a necessary outcome of this five-year review.	<p>Section 6.3 of this FYR discusses Question C, “Has any other information come to light that could call into question the protectiveness of the remedy?”</p> <p>The EPA FYR guidance (Section 4.0) provides examples of situations that should be considered in the FYR to answer Question C. This question need only be answered in the affirmative if the protectiveness of the remedy has been called into question. The former RFP experienced two severe weather events during this FYR period, which are discussed in relation to remedy protectiveness in Sections 6.1.3.1, 6.1.4.2, and 6.3 of this fourth FYR report.</p>
H. Groundwater Treatment Systems	The continued exceedances of RFLMA standards by effluent from the Solar Ponds and Present Landfill groundwater treatment systems calls into question the effectiveness of these systems.	Refer to Sections E1.1.2.2 (SPPTS) and 6.1.4.1 (PLFTS) of this fourth FYR report for a discussion of remedy performance at these treatment systems in relation to protectiveness. Monitoring data associated with the groundwater treatment systems provide valuable information to support the evaluation of remedy performance. The effluent data from these treatment systems are considered in conjunction with routine monitoring and inspection results and institutional controls to evaluate the protectiveness of the remedy.
I. Flooding	<p>The 2013 flood event incapacitated surface water monitoring equipment to the point that DOE-LM does not know the quantity of contaminants that migrated off the COU.</p> <p>No sediment sampling has been done to investigate contaminant migration off the COU. Increased exposures to radioactive materials in sediment or groundwater mobilized during flooding events, has not been evaluated.</p>	<p>The Site experienced very high flows during the second week of September 2013. In some cases the high flows and debris caused damage to the automated sampling equipment, resulting in temporary interruptions in composite sampling. At almost all locations, the unanticipated runoff volumes caused flow-paced composite bottles to fill before personnel could safely replace them with empty bottles. Access to various areas of the COU was unsafe and restricted by local authorities during certain periods. DOE has since made improvements to the surface water monitoring systems to prevent future loss of data during extreme weather events. The flow-paced surface water monitoring system previously included one sample container for water collection. Under normal conditions, the first container typically has sufficient capacity to collect the sample; however, as demonstrated in the 2013 flooding event, this container can be quickly filled during an extreme weather event. A second sample container was added to each sample location to provide additional sample volume capacity. With the current system, the second container will automatically begin to collect composite water samples once the first container is full, ensuring that samples are collected even at higher-than-normal water flow rates.</p> <p>Surface water exiting the COU is ultimately captured in the Woman Creek Reservoir, which is part of the Standley Lake Protection Project. The reservoir was constructed in the mid-1990s by the City of Westminster, with the objective of protecting Standley Lake (a drinking water source) from contaminated stormwater runoff. Water entering Woman Creek Reservoir is held for ninety days, treated if necessary, and tested for quality before being released (<a href="http://www.ci.westminster.co.us/ExploreWestminster/OpenSpace/OpenSpaceAreas/WestminsterLandofLakes/WomanCreekReservoir">http://www.ci.westminster.co.us/ExploreWestminster/OpenSpace/OpenSpaceAreas/WestminsterLandofLakes/WomanCreekReservoir</a>). From the reservoir, the water is pumped to the northeast into Walnut Creek, altogether avoiding Standley Lake.</p>
J. OLF	<p>1. Continue monthly inspections of the OLF and require additional monitoring of up-gradient groundwater levels.</p> <p>2. Highly toxic PCBs are being air-stripped from groundwater into the environment, mainly in the OLF.</p>	<p>1. <i>Continue monthly inspections of the OLF and require additional monitoring of up-gradient groundwater levels.</i> The current monthly inspection frequency for the OLF is mandated by RFLMA and cannot be decreased unless authorized by the RFLMA parties. In addition to the monthly inspections, the OLF is also inspected following extreme weather events as required by RFLMA. The monitoring of groundwater levels upgradient of the OLF is conducted to support and inform evaluation of OLF conditions and will continue at the discretion of DOE.</p> <p>2. <i>Highly toxic PCBs are being air-stripped from groundwater into the environment, mainly in the OLF.</i> This statement is incorrect. There is no treatment of PCBs, air stripping or otherwise, occurring in the COU. Air stripping is a proven, effective treatment for volatile organic compounds (i.e., chemicals that evaporate readily) in soil and water, but is not a proven technology for PCBs.</p>

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K. PLF	The fourth FYR should include a clearly defined corrective action plan to address ongoing water quality issues at the Present Landfill.	<p>Refer to Section 6.1.4.1 of this fourth FYR report for discussion of monitoring results at the PLF. The RFLMA consultative process has been triggered by PLFTS effluent monitoring results during this FYR period. However, the RFLMA parties have not required corrective action in response, since downstream surface water quality has not been impacted.</p> <p>The determination whether a corrective action (mitigation) plan is necessary to address Site conditions is made by the RFLMA parties through the RFLMA consultative process. Although the FYR report may identify issues and make recommendations based on the results of the technical assessment, any necessary action plans would be developed independent of the FYR process. Therefore, it is not appropriate to include corrective action plans in the FYR report. The RFLMA consultative process allows for the more timely identification, evaluation, and mitigation of issues rather than the FYR process.</p>
L. Uranium MCL	The CERCLA review should not make references to the current EPA drinking water standard for uranium since the drinking water standard does not apply to the Site.	DOE acknowledges that the uranium MCL is not applicable to the COU; the MCL is a nationwide health-based standard applicable to public water supply systems. Comparison of uranium concentrations to the drinking water standard in the FYR report is included simply to offer perspective on the quality of surface water at the COU boundary.
M. Hazardous Waste	The Resource Conservation and Recovery Act (RCRA) permit for the Rocky Flats Site is limited to Hazardous Waste Generator. The last documented biennial report was in 2005. Yet DOE-LM currently utilizes erosion control materials (wattles, air stripping and matting) to mitigate the migration of contaminants of concern. DOE-LM has not documented the sample analysis of such media, filed any RCRA biennial reports nor provided regulatory authority to treat, store or dispose of the contaminants of concern at the Rocky Flats Site.	<p>The RFP previously held a RCRA permit as a hazardous waste treatment, storage, and disposal facility (TSD) and was required to submit biennial hazardous waste generator reports in accordance with 40 CFR 264.75. The RCRA permit was terminated in 2006. DOE-LM rarely generates hazardous waste in the conduct of legacy management activities and as a small, or very small, quantity generator is exempt from generator biennial reporting requirements. Sample results associated with wastes generated at the site are documented in project files and are provided to the disposal facilities that receive wastes from the site.</p> <p>As a previous TSD facility, DOE-LM is required to submit a biennial report in accordance with Section 3016 of RCRA. This report, <i>Inventory of Federal Hazardous Waste Activities at Formerly Owned or Operated Federal Facilities</i>, includes a description of the location of the facility and the amount, nature, and toxicity of the hazardous waste at the site. The most recent 3016 biennial report was filed in 2016.</p>
N. FYR Report	This is only the second CERCLA Five-Year Review since the final physical and regulatory closure occurred at the Site in 2006.	The trigger for the first FYR was the signing of the CAD/ROD for OU3 in 1997; the first FYR report evaluated data from 1997 - 2001. The site was closed at the end of 2005. The second FYR report evaluated data from 2002 - 2006, which included one year of post-closure data. The third FYR report evaluated data from 2007 - 2011, and is the first review to include five continuous years of post-closure data. This fourth FYR report evaluated data from 2012- 2016 and is the second report to include five continuous years of post-closure data.
O. Quarterly Technical Meetings	Recommend continuation of the Quarterly Technical Meetings and request they occur four months after RFLMA technical documents are released.	DOE intends to continue the Quarterly Technical Meetings and will coordinate with interested stakeholders regarding meeting frequency and timing.

**References:**

DOE (U.S. Department of Energy), 2006. RCRA Facility Investigation-Remedial Investigation/Corrective Measures Study-Feasibility Study Report for the Rocky Flats Environmental Technology Site, prepared by Kaiser-Hill Company, LLC for the U.S. Department of Energy, June.

DOE, EPA, and CDPHE (U.S. Department of Energy, U.S. Environmental Protection Agency, and Colorado Department of Public Health and Environment), 2006. Corrective Action Decision/Record of Decision for Rocky Flats Plant (USDOE) Peripheral Operable Unit and Central Operable Unit, Jefferson and Boulder Counties, Colorado, September.

EPA (U.S. Environmental Protection Agency), 2001. Comprehensive Five-Year Review Guidance, EPA 540-R-01-007, Office of Emergency and Remedial Response, June.